

DATA SET 7A4
WA 2917
12-22-92
8a

PERMIT
ADMINISTRATIVE RECORD
ITEM NUMBER

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

December 22, 1992

TO: BURLINGTON ENVIRONMENTAL ENGINEERING

PROJECT NUMBER: 624878

PROJECT NAME: Pier 91

LABORATORY WORK ORDER NUMBER: 27711

FILE COPY

Samples were taken on 10/9/92 thru 10/11/92 and recieved at SAS on 10/12/92. The samples were analyzed for semivolatile organics by EPA 8270, total petroleum hydrocarbons by EPA 418.1 modified for soils, and total petroleum fuel hydrocarbons by EPA 8015 modified.

SEMIVOLATILE ORGANICS

Samples -1, -2, -3, -4, -5, -6, and -7 were extracted on 10/26/92, and analyzed on 11/2/92, 11/3/92, and 11/6/92. Both sample extraction and analysis were within holding times. Samples -2, -3, and -4 were diluted due to high contaminant levels. Di-n-butylphthalate and butyl benzyl phthalate were found in the method blank at levels above the PQL. These common laboratory contaminants were flagged as B on all sample results. Pyrene and 4-Chloro-3-Methylphenol failed the quality control limits for MS/MSD RPD, and were flagged X7a to indicate this. All other quality control parameters were within acceptance limits.

TOTAL PETROLEUM FUEL HYDROCARBONS

Samples -1, -2, -3, -4, -5, -6, and -7 were extracted on 10/20/92 and analyzed on 10/23/92, both within holding times. Surrogate recoveries for samples -1 and -3 were flagged X10 to indicate matrix interferences caused recoveries to fall outside QC limits. MS/MSD recoveries failed QC limits due to high contaminant levels in the spiked sample, and were flagged X7a to indicate this. All other quality control parameters were within acceptance limits.

TOTAL PETROLEUM HYDROCARBONS

Samples -1, -2, -3, -4, -5, -6, and -7 were extracted on 10/15/92 and analyzed on 10/19/92, both within holding times. All quality control parameters were within acceptance limits.

All samples were dry weight corrected.

No blank correction was used.

Data qualifier flags are included in the quality control package.

USEPA RCRA



3012490

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Burlington Environmental
Engineering

Date: December 9, 1992

Report On: Analysis of Soil

Lab No.: 27711

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IDENTIFICATION:

Samples Received on 10-12-92

Project: 624878 Pier 91

ANALYSIS:

Lab No. 27711-1

Client ID: CP-122A-14-16

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-6-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	830	
111-44-4	bis(2-Chloroethyl) ether	ND	830	
95-57-8	2-Chlorophenol	ND	830	
541-73-1	1,3-Dichlorobenzene	ND	830	
106-46-7	1,4-Dichlorobenzene	ND	830	
100-51-6	Benzyl Alcohol	ND	1,700	
95-50-1	1,2-Dichlorobenzene	ND	830	
95-48-7	2-Methylphenol	ND	830	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	830	
106-44-5	4-Methylphenol	ND	830	
621-64-7	N-Nitroso-Di-N-propylamine	ND	830	
67-72-1	Hexachloroethane	ND	830	
98-95-3	Nitrobenzene	ND	830	
78-59-1	Isophorone	ND	830	
88-75-5	2-Nitrophenol	ND	830	
105-67-9	2,4-Dimethylphenol	ND	830	
65-85-0	Benzoic Acid	ND	4,100	
111-91-1	bis(2-Chloroethoxy)methane	ND	830	
120-83-2	2,4-Dichlorophenol	ND	830	
120-82-1	1,2,4-Trichlorobenzene	ND	830	
91-20-3	Naphthalene	ND	830	
106-47-8	4-Chloroaniline	ND	1,700	
87-68-3	Hexachlorobutadiene	ND	830	
59-50-7	4-Chloro-3-methylphenol	ND	1,700	

ND - Not Detected

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SOUND ANALYTICAL SERVICES, INC.

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Lab No. 27711-1

Client ID: CP-122A-14-16

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	ND	830	
77-47-4	Hexachlorocyclopentadiene	ND	830	
88-06-2	2,4,6-Trichlorophenol	ND	830	
95-95-4	2,4,5-Trichlorophenol	ND	830	
91-58-7	2-Chloronaphthalene	ND	830	
88-74-4	2-Nitroaniline	ND	4,100	
131-11-3	Dimethyl phthalate	ND	830	
208-96-8	Acenaphthylene	ND	830	
606-20-2	2,6-Dinitrotoluene	ND	830	
99-09-2	3-Nitroaniline	ND	4,100	
83-32-9	Acenaphthene	ND	830	
51-28-5	2,4-Dinitrophenol	ND	4,100	
100-02-7	4-Nitrophenol	ND	4,100	
132-64-9	Dibenzofuran	ND	830	
121-14-2	2,4-Dinitrotoluene	ND	830	
84-66-2	Diethylphthalate	ND	830	
7005-72-3	4-Chlorophenyl phenyl ether	ND	830	
86-73-7	Fluorene	ND	830	
100-01-6	4-Nitroaniline	ND	4,100	
534-52-1	4,6-Dinitro-2-methylphenol	ND	4,100	
86-30-6	N-Nitrosodiphenylamine	ND	830	
101-55-3	4-Bromophenyl phenyl ether	ND	830	
118-74-1	Hexachlorobenzene	ND	830	
87-86-5	Pentachlorophenol	ND	4,100	
85-01-8	Phenanthrene	150	830	J
120-12-7	Anthracene	ND	830	
84-74-2	Di-n-butylphthalate	ND	830	

ND - Not Detected

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Lab No. 27711-1

Client ID: CP-122A-14-16

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	ND	830	
129-00-0	Pyrene	ND	830	
85-68-7	Butyl benzyl phthalate	ND	830	
91-94-1	3,3'-Dichlorobenzidine	ND	1,700	
56-55-3	Benzo(a)anthracene	ND	830	
218-01-9	Chrysene	ND	830	
117-81-7	bis(2-ethylhexyl)phthalate	ND	830	
117-84-0	Di-n-octyl phthalate	ND	830	
205-99-2	Benzo(b)fluoranthene	ND	830	
207-08-9	Benzo(k)fluoranthene	ND	830	
50-32-8	Benzo(a)pyrene	ND	830	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	830	
53-70-3	Dibenz(a,h)anthracene	ND	830	
191-24-2	Benzo(g,h,i)perylene	ND	830	

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	76	35 - 114	23 - 120
2-Fluorobiphenyl	87	43 - 116	30 - 115
p-Terphenyl-d ₁₄	97	33 - 141	18 - 137
Phenol-d ₆	76	10 - 94	24 - 113
2-Fluorophenol	90	21 - 100	25 - 121
2,4,6-Tribromophenol	75	10 - 123	19 - 122

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Lab No. 27711
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Lab No. 27711-1

Client ID: CP-122A-14-16

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg 510

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

Total Petroleum
Fuel Hydrocarbons, mg/kg 980

TPH as Diesel, Heavy Oil

<u>SURROGATE RECOVERY, %</u>		
1-chlorooctane	84	
o-terphenyl	164	X10

Note: Heavy Oil concentration is estimated using diesel curve.

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 December 9, 1992

Lab No. 27711-2

Client ID: CP-111-2-4

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-2-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	2,900	
111-44-4	bis(2-Chloroethyl) ether	ND	2,900	
95-57-8	2-Chlorophenol	ND	2,900	
541-73-1	1,3-Dichlorobenzene	ND	2,900	
106-46-7	1,4-Dichlorobenzene	ND	2,900	
100-51-6	Benzyl Alcohol	ND	5,800	
95-50-1	1,2-Dichlorobenzene	ND	2,900	
95-48-7	2-Methylphenol	ND	2,900	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	2,900	
106-44-5	4-Methylphenol	ND	2,900	
621-64-7	N-Nitroso-Di-N-propylamine	ND	2,900	
67-72-1	Hexachloroethane	ND	2,900	
98-95-3	Nitrobenzene	ND	2,900	
78-59-1	Isophorone	ND	2,900	
88-75-5	2-Nitrophenol	ND	2,900	
105-67-9	2,4-Dimethylphenol	ND	2,900	
65-85-0	Benzoic Acid	ND	14,000	
111-91-1	bis(2-Chloroethoxy) methane	ND	2,900	
120-83-2	2,4-Dichlorophenol	ND	2,900	
120-82-1	1,2,4-Trichlorobenzene	ND	2,900	
91-20-3	Naphthalene	32,000	2,900	
106-47-8	4-Chloroaniline	ND	5,800	
87-68-3	Hexachlorobutadiene	ND	2,900	
59-50-7	4-Chloro-3-methylphenol	ND	5,800	

ND - Not Detected

Continued

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 Lab No. 27711
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Lab No. 27711-2

Client ID: CP-111-2-4

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	20,000	2,900	
77-47-4	Hexachlorocyclopentadiene	ND	2,900	
88-06-2	2,4,6-Trichlorophenol	ND	2,900	
95-95-4	2,4,5-Trichlorophenol	ND	2,900	
91-58-7	2-Chloronaphthalene	ND	2,900	
88-74-4	2-Nitroaniline	ND	14,000	
131-11-3	Dimethyl phthalate	ND	2,900	
208-96-8	Acenaphthylene	900	2,900	J
606-20-2	2,6-Dinitrotoluene	ND	2,900	
99-09-2	3-Nitroaniline	ND	14,000	
83-32-9	Acenaphthene	2,600	2,900	J
51-28-5	2,4-Dinitrophenol	ND	14,000	
100-02-7	4-Nitrophenol	ND	14,000	
132-64-9	Dibenzofuran	6,400	2,900	
121-14-2	2,4-Dinitrotoluene	ND	2,900	
84-66-2	Diethylphthalate	ND	2,900	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2,900	
86-73-7	Fluorene	17,000	2,900	
100-01-6	4-Nitroaniline	ND	14,000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	14,000	
86-30-6	N-Nitrosodiphenylamine	ND	2,900	
101-55-3	4-Bromophenyl phenyl ether	ND	2,900	
118-74-1	Hexachlorobenzene	ND	2,900	
87-86-5	Pentachlorophenol	ND	14,000	
85-01-8	Phenanthrene	57,000	2,900	
120-12-7	Anthracene	14,000	2,900	
84-74-2	Di-n-butylphthalate	2,000	2,900	B, J

ND - Not Detected

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Lab No. 27711-2

Client ID: CP-111-2-4

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	61,000	2,900	
129-00-0	Pyrene	78,000	2,900	
85-68-7	Butyl benzyl phthalate	ND	2,900	
91-94-1	3,3'-Dichlorobenzidine	ND	5,800	
56-55-3	Benzo(a)anthracene	50,000	2,900	
218-01-9	Chrysene	28,000	2,900	
117-81-7	bis(2-ethylhexyl)phthalate	ND	2,900	
117-84-0	Di-n-octyl phthalate	ND	2,900	
205-99-2	Benzo(b)fluoranthene	58,000	2,900	
207-08-9	Benzo(k)fluoranthene	ND	2,900	
50-32-8	Benzo(a)pyrene	29,000	2,900	
193-39-5	Indeno(1,2,3-cd)pyrene	22,000	2,900	
53-70-3	Dibenz(a,h)anthracene	ND	2,900	
191-24-2	Benzo(g,h,i)perylene	20,000	2,900	

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	74	35 - 114	23 - 120
2-Fluorobiphenyl	90	43 - 116	30 - 115
p-Terphenyl-d ₁₄	128	33 - 141	18 - 137
Phenol-d ₆	75	10 - 94	24 - 113
2-Fluorophenol	78	21 - 100	25 - 121
2,4,6-Tribromophenol	90	10 - 123	19 - 122

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SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
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Lab No. 27711
December 9, 1992

Lab No. 27711-2

Client ID: CP-111-2-4

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg 2,200

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

Total Petroleum
Fuel Hydrocarbons, mg/kg 11,000

TPH as Diesel, Heavy Oil

<u>SURROGATE RECOVERY, %</u>	
1-chlorooctane	57
o-terphenyl	129

Note: Heavy Oil concentration is estimated using diesel curve.

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SOUND ANALYTICAL SERVICES, INC.

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 Lab No. 27711
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Lab No. 27711-3

Client ID: CP-111-6-8

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-2-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	2,800	
111-44-4	bis(2-Chloroethyl) ether	ND	2,800	
95-57-8	2-Chlorophenol	ND	2,800	
541-73-1	1,3-Dichlorobenzene	ND	2,800	
106-46-7	1,4-Dichlorobenzene	ND	2,800	
100-51-6	Benzyl Alcohol	ND	5,700	
95-50-1	1,2-Dichlorobenzene	ND	2,800	
95-48-7	2-Methylphenol	ND	2,800	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	2,800	
106-44-5	4-Methylphenol	ND	2,800	
621-64-7	N-Nitroso-Di-N-propylamine	ND	2,800	
67-72-1	Hexachloroethane	ND	2,800	
98-95-3	Nitrobenzene	ND	2,800	
78-59-1	Isophorone	ND	2,800	
88-75-5	2-Nitrophenol	ND	2,800	
105-67-9	2,4-Dimethylphenol	ND	2,800	
65-85-0	Benzoic Acid	ND	14,000	
111-91-1	bis(2-Chloroethoxy) methane	ND	2,800	
120-83-2	2,4-Dichlorophenol	ND	2,800	
120-82-1	1,2,4-Trichlorobenzene	ND	2,800	
91-20-3	Naphthalene	ND	2,800	
106-47-8	4-Chloroaniline	ND	5,700	
87-68-3	Hexachlorobutadiene	ND	2,800	
59-50-7	4-Chloro-3-methylphenol	ND	5,700	

ND - Not Detected

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SOUND ANALYTICAL SERVICES, INC.

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Lab No. 27711-3

Client ID: CP-111-6-8

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	ND	2,800	
77-47-4	Hexachlorocyclopentadiene	ND	2,800	
88-06-2	2,4,6-Trichlorophenol	ND	2,800	
95-95-4	2,4,5-Trichlorophenol	ND	2,800	
91-58-7	2-Chloronaphthalene	ND	2,800	
88-74-4	2-Nitroaniline	ND	14,000	
131-11-3	Dimethyl phthalate	ND	2,800	
208-96-8	Acenaphthylene	ND	2,800	
606-20-2	2,6-Dinitrotoluene	ND	2,800	
99-09-2	3-Nitroaniline	ND	14,000	
83-32-9	Acenaphthene	1,500	2,800	J
51-28-5	2,4-Dinitrophenol	ND	14,000	
100-02-7	4-Nitrophenol	ND	14,000	
132-64-9	Dibenzofuran	ND	2,800	
121-14-2	2,4-Dinitrotoluene	ND	2,800	
84-66-2	Diethylphthalate	ND	2,800	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2,800	
86-73-7	Fluorene	1,600	2,800	J
100-01-6	4-Nitroaniline	ND	14,000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	14,000	
86-30-6	N-Nitrosodiphenylamine	ND	2,800	
101-55-3	4-Bromophenyl phenyl ether	ND	2,800	
118-74-1	Hexachlorobenzene	ND	2,800	
87-86-5	Pentachlorophenol	ND	14,000	
85-01-8	Phenanthrene	3,600	2,800	
120-12-7	Anthracene	750	2,800	J
84-74-2	Di-n-butylphthalate	ND	2,800	

ND - Not Detected

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Lab No. 27711-3

Client ID: CP-111-6-8

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	2,700	2,800	J
129-00-0	Pyrene	3,000	2,800	
85-68-7	Butyl benzyl phthalate	ND	2,800	
91-94-1	3,3'-Dichlorobenzidine	ND	5,700	
56-55-3	Benzo(a)anthracene	890	2,800	J
218-01-9	Chrysene	ND	2,800	
117-81-7	bis(2-ethylhexyl)phthalate	ND	2,800	
117-84-0	Di-n-octyl phthalate	ND	2,800	
205-99-2	Benzo(b)fluoranthene	1,200	2,800	J
207-08-9	Benzo(k)fluoranthene	ND	2,800	
50-32-8	Benzo(a)pyrene	730	2,800	J
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2,800	
53-70-3	Dibenz(a,h)anthracene	ND	2,800	
191-24-2	Benzo(g,h,i)perylene	570	2,800	J

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	70	35 - 114	23 - 120
2-Fluorobiphenyl	86	43 - 116	30 - 115
p-Terphenyl-d ₁₄	106	33 - 141	18 - 137
Phenol-d ₆	67	10 - 94	24 - 113
2-Fluorophenol	75	21 - 100	25 - 121
2,4,6-Tribromophenol	64	10 - 123	19 - 122

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SOUND ANALYTICAL SERVICES, INC.

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Lab No. 27711
December 9, 1992

Lab No. 27711-3

Client ID: CP-111-6-8

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg 3,700

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

Total Petroleum
Fuel Hydrocarbons, mg/kg 6,300

TPH as Aged Gasoline

SURROGATE RECOVERY, %

1-chlorooctane	16	
o-terphenyl	191	X10

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SOUND ANALYTICAL SERVICES, INC.

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 Lab No. 27711
 December 9, 1992

Lab No. 27711-4

Client ID: CP-112-2-4

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-2-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	2,800	
111-44-4	bis(2-Chloroethyl) ether	ND	2,800	
95-57-8	2-Chlorophenol	ND	2,800	
541-73-1	1,3-Dichlorobenzene	ND	2,800	
106-46-7	1,4-Dichlorobenzene	ND	2,800	
100-51-6	Benzyl Alcohol	ND	5,700	
95-50-1	1,2-Dichlorobenzene	ND	2,800	
95-48-7	2-Methylphenol	ND	2,800	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	2,800	
106-44-5	4-Methylphenol	ND	2,800	
621-64-7	N-Nitroso-Di-N-propylamine	ND	2,800	
67-72-1	Hexachloroethane	ND	2,800	
98-95-3	Nitrobenzene	ND	2,800	
78-59-1	Isophorone	ND	2,800	
88-75-5	2-Nitrophenol	ND	2,800	
105-67-9	2,4-Dimethylphenol	ND	2,800	
65-85-0	Benzoic Acid	ND	14,000	
111-91-1	bis(2-Chloroethoxy) methane	ND	2,800	
120-83-2	2,4-Dichlorophenol	ND	2,800	
120-82-1	1,2,4-Trichlorobenzene	ND	2,800	
91-20-3	Naphthalene	ND	2,800	
106-47-8	4-Chloroaniline	ND	5,700	
87-68-3	Hexachlorobutadiene	ND	2,800	
59-50-7	4-Chloro-3-methylphenol	ND	5,700	

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

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 Lab No. 27711
 December 9, 1992

Lab No. 27711-4

Client ID: CP-112-2-4

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	ND	2,800	J
77-47-4	Hexachlorocyclopentadiene	ND	2,800	
88-06-2	2,4,6-Trichlorophenol	ND	2,800	
95-95-4	2,4,5-Trichlorophenol	ND	2,800	
91-58-7	2-Chloronaphthalene	ND	2,800	
88-74-4	2-Nitroaniline	ND	14,000	
131-11-3	Dimethyl phthalate	ND	2,800	
208-96-8	Acenaphthylene	620	2,800	
606-20-2	2,6-Dinitrotoluene	ND	2,800	
99-09-2	3-Nitroaniline	ND	14,000	
83-32-9	Acenaphthene	ND	2,800	
51-28-5	2,4-Dinitrophenol	ND	14,000	
100-02-7	4-Nitrophenol	ND	14,000	
132-64-9	Dibenzofuran	ND	2,800	
121-14-2	2,4-Dinitrotoluene	ND	2,800	
84-66-2	Diethylphthalate	ND	2,800	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2,800	
86-73-7	Fluorene	ND	2,800	
100-01-6	4-Nitroaniline	ND	14,000	
534-52-1	4,6-Dinitro-2-methylphenol	ND	14,000	
86-30-6	N-Nitrosodiphenylamine	ND	2,800	
101-55-3	4-Bromophenyl phenyl ether	ND	2,800	
118-74-1	Hexachlorobenzene	ND	2,800	
87-86-5	Pentachlorophenol	ND	14,000	
85-01-8	Phenanthrene	2,200	2,800	J
120-12-7	Anthracene	500	2,800	J
84-74-2	Di-n-butylphthalate	5,900	2,800	B

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-4

Client ID: CP-112-2-4

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	3,700	2,800	J, B
129-00-0	Pyrene	6,600	2,800	
85-68-7	Butyl benzyl phthalate	1,900	2,800	
91-94-1	3,3'-Dichlorobenzidine	ND	5,700	
56-55-3	Benzo(a)anthracene	3,000	2,800	
218-01-9	Chrysene	3,900	2,800	
117-81-7	bis(2-ethylhexyl)phthalate	ND	2,800	
117-84-0	Di-n-octyl phthalate	ND	2,800	
205-99-2	Benzo(b)fluoranthene	5,600	2,800	
207-08-9	Benzo(k)fluoranthene	ND	2,800	
50-32-8	Benzo(a)pyrene	3,500	2,800	J
193-39-5	Indeno(1,2,3-cd)pyrene	3,000	2,800	
53-70-3	Dibenz(a,h)anthracene	700	2,800	
191-24-2	Benzo(g,h,i)perylene	3,200	2,800	

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	76	35 - 114	23 - 120
2-Fluorobiphenyl	89	43 - 116	30 - 115
p-Terphenyl-d ₁₄	117	33 - 141	18 - 137
Phenol-d ₆	66	10 - 94	24 - 113
2-Fluorophenol	72	21 - 100	25 - 121
2,4,6-Tribromophenol	69	10 - 123	19 - 122

Continued

SOUND ANALYTICAL SERVICES, INC.

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Lab No. 27711
December 9, 1992

Lab No. 27711-4

Client ID: CP-112-2-4

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg 420

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

Total Petroleum
Fuel Hydrocarbons, mg/kg 2,400

TPH as Diesel, Heavy Oil

<u>SURROGATE RECOVERY, %</u>	
1-chlorooctane	123
o-terphenyl	147

Note: Heavy Oil concentration is estimated using diesel curve.

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-5

Client ID: CP-112-6-8

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-6-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	1,000	
111-44-4	bis(2-Chloroethyl) ether	ND	1,000	
95-57-8	2-Chlorophenol	ND	1,000	
541-73-1	1,3-Dichlorobenzene	ND	1,000	
106-46-7	1,4-Dichlorobenzene	ND	1,000	
100-51-6	Benzyl Alcohol	ND	2,100	
95-50-1	1,2-Dichlorobenzene	ND	1,000	
95-48-7	2-Methylphenol	ND	1,000	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	1,000	
106-44-5	4-Methylphenol	ND	1,000	
621-64-7	N-Nitroso-Di-N-propylamine	ND	1,000	
67-72-1	Hexachloroethane	ND	1,000	
98-95-3	Nitrobenzene	ND	1,000	
78-59-1	Isophorone	ND	1,000	
88-75-5	2-Nitrophenol	ND	1,000	
105-67-9	2,4-Dimethylphenol	ND	1,000	
65-85-0	Benzoic Acid	ND	5,200	
111-91-1	bis(2-Chloroethoxy)methane	ND	1,000	
120-83-2	2,4-Dichlorophenol	ND	1,000	
120-82-1	1,2,4-Trichlorobenzene	ND	1,000	
91-20-3	Naphthalene	ND	1,000	
106-47-8	4-Chloroaniline	ND	2,100	
87-68-3	Hexachlorobutadiene	ND	1,000	
59-50-7	4-Chloro-3-methylphenol	ND	2,100	

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-5

Client ID: CP-112-6-8

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	ND	1,000	
77-47-4	Hexachlorocyclopentadiene	ND	1,000	
88-06-2	2,4,6-Trichlorophenol	ND	1,000	
95-95-4	2,4,5-Trichlorophenol	ND	1,000	
91-58-7	2-Chloronaphthalene	ND	1,000	
88-74-4	2-Nitroaniline	ND	5,200	
131-11-3	Dimethyl phthalate	ND	1,000	
208-96-8	Acenaphthylene	ND	1,000	
606-20-2	2,6-Dinitrotoluene	ND	1,000	
99-09-2	3-Nitroaniline	ND	5,200	
83-32-9	Acenaphthene	ND	1,000	
51-28-5	2,4-Dinitrophenol	ND	5,200	
100-02-7	4-Nitrophenol	ND	5,200	
132-64-9	Dibenzofuran	ND	1,000	
121-14-2	2,4-Dinitrotoluene	ND	1,000	
84-66-2	Diethylphthalate	ND	1,000	
7005-72-3	4-Chlorophenyl phenyl ether	ND	1,000	
86-73-7	Fluorene	ND	1,000	
100-01-6	4-Nitroaniline	ND	5,200	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5,200	
86-30-6	N-Nitrosodiphenylamine	ND	1,000	
101-55-3	4-Bromophenyl phenyl ether	ND	1,000	
118-74-1	Hexachlorobenzene	ND	1,000	
87-86-5	Pentachlorophenol	ND	5,200	
85-01-8	Phenanthrene	ND	1,000	
120-12-7	Anthracene	ND	1,000	
84-74-2	Di-n-butylphthalate	ND	1,000	

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-5

Client ID: CP-112-6-8

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	ND	1,000	
129-00-0	Pyrene	ND	1,000	
85-68-7	Butyl benzyl phthalate	ND	1,000	
91-94-1	3,3'-Dichlorobenzidine	ND	2,100	
56-55-3	Benzo(a)anthracene	ND	1,000	
218-01-9	Chrysene	ND	1,000	
117-81-7	bis(2-ethylhexyl)phthalate	ND	1,000	
117-84-0	Di-n-octyl phthalate	ND	1,000	
205-99-2	Benzo(b)fluoranthene	ND	1,000	
207-08-9	Benzo(k)fluoranthene	ND	1,000	
50-32-8	Benzo(a)pyrene	ND	1,000	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1,000	
53-70-3	Dibenz(a,h)anthracene	ND	1,000	
191-24-2	Benzo(g,h,i)perylene	110	1,000	J

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	51	35 - 114	23 - 120
2-Fluorobiphenyl	53	43 - 116	30 - 115
p-Terphenyl-d ₁₄	79	33 - 141	18 - 137
Phenol-d ₆	53	10 - 94	24 - 113
2-Fluorophenol	60	21 - 100	25 - 121
2,4,6-Tribromophenol	57	10 - 123	19 - 122

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878
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Lab No. 27711
December 9, 1992

Lab No. 27711-5

Client ID: CP-112-6-8

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg

64

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

Total Petroleum
Fuel Hydrocarbons, mg/kg

120

TPH as Diesel, Heavy Oil

SURROGATE RECOVERY, %

1-chlorooctane

71

o-terphenyl

106

Note: Heavy Oil concentration is estimated using diesel curve.

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-6

Client ID: CP-113-2-4

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-6-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	690	
111-44-4	bis(2-Chloroethyl) ether	ND	690	
95-57-8	2-Chlorophenol	ND	690	
541-73-1	1,3-Dichlorobenzene	ND	690	
106-46-7	1,4-Dichlorobenzene	ND	690	
100-51-6	Benzyl Alcohol	ND	1,400	
95-50-1	1,2-Dichlorobenzene	ND	690	
95-48-7	2-Methylphenol	ND	690	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	690	
106-44-5	4-Methylphenol	ND	690	
621-64-7	N-Nitroso-Di-N-propylamine	ND	690	
67-72-1	Hexachloroethane	ND	690	
98-95-3	Nitrobenzene	ND	690	
78-59-1	Isophorone	ND	690	
88-75-5	2-Nitrophenol	ND	690	
105-67-9	2,4-Dimethylphenol	ND	690	
65-85-0	Benzoic Acid	ND	3,400	
111-91-1	bis(2-Chloroethoxy)methane	ND	690	
120-83-2	2,4-Dichlorophenol	ND	690	
120-82-1	1,2,4-Trichlorobenzene	ND	690	
91-20-3	Naphthalene	ND	690	
106-47-8	4-Chloroaniline	ND	1,400	
87-68-3	Hexachlorobutadiene	ND	690	
59-50-7	4-Chloro-3-methylphenol	ND	1,400	

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-6

Client ID: CP-113-2-4

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	ND	690	
77-47-4	Hexachlorocyclopentadiene	ND	690	
88-06-2	2,4,6-Trichlorophenol	ND	690	
95-95-4	2,4,5-Trichlorophenol	ND	690	
91-58-7	2-Chloronaphthalene	ND	690	
88-74-4	2-Nitroaniline	ND	3,400	
131-11-3	Dimethyl phthalate	ND	690	
208-96-8	Acenaphthylene	ND	690	
606-20-2	2,6-Dinitrotoluene	ND	690	
99-09-2	3-Nitroaniline	ND	3,400	
83-32-9	Acenaphthene	ND	690	
51-28-5	2,4-Dinitrophenol	ND	3,400	
100-02-7	4-Nitrophenol	ND	3,400	
132-64-9	Dibenzofuran	ND	690	
121-14-2	2,4-Dinitrotoluene	ND	690	
84-66-2	Diethylphthalate	ND	690	
7005-72-3	4-Chlorophenyl phenyl ether	ND	690	
86-73-7	Fluorene	ND	690	
100-01-6	4-Nitroaniline	ND	3,400	
534-52-1	4,6-Dinitro-2-methylphenol	ND	3,400	
86-30-6	N-Nitrosodiphenylamine	ND	690	
101-55-3	4-Bromophenyl phenyl ether	ND	690	
118-74-1	Hexachlorobenzene	ND	690	
87-86-5	Pentachlorophenol	ND	3,400	
85-01-8	Phenanthrene	ND	690	
120-12-7	Anthracene	ND	690	
84-74-2	Di-n-butylphthalate	ND	690	

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-6

Client ID: CP-113-2-4

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	ND	690	
129-00-0	Pyrene	ND	690	
85-68-7	Butyl benzyl phthalate	ND	690	
91-94-1	3,3'-Dichlorobenzidine	ND	1,400	
56-55-3	Benzo(a)anthracene	ND	690	
218-01-9	Chrysene	ND	690	
117-81-7	bis(2-ethylhexyl)phthalate	ND	690	
117-84-0	Di-n-octyl phthalate	ND	690	
205-99-2	Benzo(b)fluoranthene	ND	690	
207-08-9	Benzo(k)fluoranthene	ND	690	
50-32-8	Benzo(a)pyrene	ND	690	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	690	
53-70-3	Dibenz(a,h)anthracene	ND	690	
191-24-2	Benzo(g,h,i)perylene	ND	690	

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	67	35 - 114	23 - 120
2-Fluorobiphenyl	73	43 - 116	30 - 115
p-Terphenyl-d ₁₄	84	33 - 141	18 - 137
Phenol-d ₆	63	10 - 94	24 - 113
2-Fluorophenol	70	21 - 100	25 - 121
2,4,6-Tribromophenol	70	10 - 123	19 - 122

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878
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Lab No. 27711
December 9, 1992

Lab No. 27711-6

Client ID: CP-113-2-4

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg 35

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

Total Petroleum
Fuel Hydrocarbons, mg/kg 60

TPH as Diesel, Heavy Oil

SURROGATE RECOVERY, %
1-chlorooctane 72
o-terphenyl 104

Note: Heavy Oil concentration is estimated using diesel curve.

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-7

Client ID: CP-113-6-8

Semivolatile Organics Per EPA SW-846 Method 8270

Date Extracted: 10-26-92

Date Analyzed: 11-3-92

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
108-95-2	Phenol	ND	940	
111-44-4	bis(2-Chloroethyl) ether	ND	940	
95-57-8	2-Chlorophenol	ND	940	
541-73-1	1,3-Dichlorobenzene	ND	940	
106-46-7	1,4-Dichlorobenzene	ND	940	
100-51-6	Benzyl Alcohol	ND	1,900	
95-50-1	1,2-Dichlorobenzene	ND	940	
95-48-7	2-Methylphenol	ND	940	
39638-32-9	bis(2-Chloroisopropyl) ether	ND	940	
106-44-5	4-Methylphenol	ND	940	
621-64-7	N-Nitroso-Di-N-propylamine	ND	940	
67-72-1	Hexachloroethane	ND	940	
98-95-3	Nitrobenzene	ND	940	
78-59-1	Isophorone	ND	940	
88-75-5	2-Nitrophenol	ND	940	
105-67-9	2,4-Dimethylphenol	ND	940	
65-85-0	Benzoic Acid	ND	4,700	
111-91-1	bis(2-Chloroethoxy)methane	ND	940	
120-83-2	2,4-Dichlorophenol	ND	940	
120-82-1	1,2,4-Trichlorobenzene	ND	940	
91-20-3	Naphthalene	ND	940	
106-47-8	4-Chloroaniline	ND	1,900	
87-68-3	Hexachlorobutadiene	ND	940	
59-50-7	4-Chloro-3-methylphenol	ND	1,900	

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-7

Client ID: CP-113-6-8

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
91-57-6	2-Methylnaphthalene	ND	940	
77-47-4	Hexachlorocyclopentadiene	ND	940	
88-06-2	2,4,6-Trichlorophenol	ND	940	
95-95-4	2,4,5-Trichlorophenol	ND	940	
91-58-7	2-Chloronaphthalene	ND	940	
88-74-4	2-Nitroaniline	ND	4,700	
131-11-3	Dimethyl phthalate	ND	940	
208-96-8	Acenaphthylene	ND	940	
606-20-2	2,6-Dinitrotoluene	ND	940	
99-09-2	3-Nitroaniline	ND	4,700	
83-32-9	Acenaphthene	ND	940	
51-28-5	2,4-Dinitrophenol	ND	4,700	
100-02-7	4-Nitrophenol	ND	4,700	
132-64-9	Dibenzofuran	ND	940	
121-14-2	2,4-Dinitrotoluene	ND	940	
84-66-2	Diethylphthalate	ND	940	
7005-72-3	4-Chlorophenyl phenyl ether	ND	940	
86-73-7	Fluorene	ND	940	
100-01-6	4-Nitroaniline	ND	4,700	
534-52-1	4,6-Dinitro-2-methylphenol	ND	4,700	
86-30-6	N-Nitrosodiphenylamine	ND	940	
101-55-3	4-Bromophenyl phenyl ether	ND	940	
118-74-1	Hexachlorobenzene	ND	940	
87-86-5	Pentachlorophenol	ND	4,700	
85-01-8	Phenanthrene	ND	940	
120-12-7	Anthracene	ND	940	
84-74-2	Di-n-butylphthalate	2,800	940	B

ND - Not Detected

Continued

SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
 Project: 624878
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 Lab No. 27711
 December 9, 1992

Lab No. 27711-7

Client ID: CP-113-6-8

EPA Method 8270 Continued

CAS No.	Compounds	Concentration ug/kg	PQL	FLAG
206-44-0	Fluoranthene	ND	940	
129-00-0	Pyrene	ND	940	
85-68-7	Butyl benzyl phthalate	ND	940	
91-94-1	3,3'-Dichlorobenzidine	ND	1,900	
56-55-3	Benzo(a)anthracene	ND	940	
218-01-9	Chrysene	ND	940	
117-81-7	bis(2-ethylhexyl)phthalate	ND	940	
117-84-0	Di-n-octyl phthalate	ND	940	
205-99-2	Benzo(b)fluoranthene	ND	940	
207-08-9	Benzo(k)fluoranthene	ND	940	
50-32-8	Benzo(a)pyrene	ND	940	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	940	
53-70-3	Dibenz(a,h)anthracene	ND	940	
191-24-2	Benzo(g,h,i)perylene	ND	940	

ND - Not Detected

PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

Semi-Volatile Surrogates

Surrogate Compound	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d ₅	82	35 - 114	23 - 120
2-Fluorobiphenyl	88	43 - 116	30 - 115
p-Terphenyl-d ₁₄	95	33 - 141	18 - 137
Phenol-d ₆	82	10 - 94	24 - 113
2-Fluorophenol	89	21 - 100	25 - 121
2,4,6-Tribromophenol	78	10 - 123	19 - 122

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SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878
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Lab No. 27711
December 9, 1992

Lab No. 27711-7

Client ID: CP-113-6-8

TPH Per EPA Method 418.1
Date Extracted: 10-15-92
Date Analyzed: 10-19-92

Total Petroleum
Hydrocarbons, mg/kg 2,000

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 10-20-92
Date Analyzed: 10-23-92

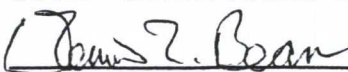
Total Petroleum
Fuel Hydrocarbons, mg/kg 2,200

TPH as Aged Gasoline, Diesel, Heavy Oil

<u>SURROGATE RECOVERY, %</u>	
1-chlorooctane	95
o-terphenyl	70

Note: Heavy Oil concentration is estimated using diesel curve.

SOUND ANALYTICAL SERVICES


DENNIS L. BEAN

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

QUALITY CONTROL REPORT

TPH by Method 418.1

Client: Burlington Environmental - Engineering
Lab No: 27711qcl
Matrix: Soil
Units: mg/kg
Date: December 9, 1992

DUPLICATE

Dup No. 27711-4

Parameter	Sample(S)	Duplicate(D)	RPD
Total Petroleum Hydrocarbons	420	410	2.4

RPD = Relative Percent Difference
= $[(S - D) / ((S + D) / 2)] \times 100$

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

MSD No. 27711-4

Parameter	Sample Result (SR)	Spiked Sample Result (MS)	Spike Added (SA)	%R	Spike Dup Result (MSD)	RPD
Total Petroleum Hydrocarbons	420	1,300	920	95.7	1,200	8.0

%R = Percent Recovery
= $[(MS - SR) / SA] \times 100$

RPD = Relative Percent Difference
= $[(MS - MSD) / ((MS + MSD) / 2)] \times 100$

METHOD BLANK

Parameter	Blank Value
Total Petroleum Hydrocarbons	< 10

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SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

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QUALITY CONTROL REPORT

Total Petroleum Fuel Hydrocarbons
by Method 8015

Page 1 of 2

Client: Burlington Environmental - Engineering
Lab No: 27711qc2
Matrix: Soil
Units: mg/kg
Date: December 9, 1992

DUPLICATE

Dup. No. 27711-4

Parameter	Sample(S)	Duplicate(D)	RPD
Total Petroleum Fuel Hydrocarbons	2,400	2,400	0.0
<u>SURROGATE RECOVERY%</u>			
1-chlorooctane	123	85	
o-terphenyl	147	111	

RPD = relative percent difference
$$= [(S - D) / ((S + D) / 2)] \times 100$$

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

MSD No. 27711-4

Parameter	Sample Result (SR)	Spiked Sample Result (MS)	Spike Added (SA)	%R	Spike Dup Result (MSD)	RPD	Flag
Total Petroleum Fuel Hydrocarbons	2,400	3,300	405	222	2,400	0.0	X7a

%R = Percent Recovery
$$= [(MS - SR) / SA] \times 100$$

RPD = Relative Percent Difference
$$= [(MS - MSD) / ((MS + MSD) / 2)] \times 100$$

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Total Petroleum Fuel Hydrocarbons
by Method 8015

Page 2 of 2

Client: Burlington Environmental - Engineering
Lab No: 27711qc2
Units: mg/kg
Date: December 9, 1992

METHOD BLANK

Blank No. 003F0101.D

Parameter	Blank Value
Total Petroleum Fuel Hydrocarbons	< 10
<u>SURROGATE RECOVERY%</u>	
1-chlorooctane	90
o-terphenyl	89

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QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Page 1 of 3

Client: Burlington Environmental - Engineering
Lab No: 27711qc3
Units: ug/kg
Date: December 9, 1992
Blank No: S6641
Date Analyzed: 11-5-92

METHOD BLANK

Compound	Blank Value	PQL	Flags
Phenol	ND	670	
bis(2-Chloroethyl) ether	ND	670	
2-Chlorophenol	ND	670	
1,3-Dichlorobenzene	ND	670	
1,4-Dichlorobenzene	ND	670	
Benzyl Alcohol	ND	1,300	
1,2-Dichlorobenzene	ND	670	
2-Methylphenol	ND	670	
bis(2-Chloroisopropyl) ether	ND	670	
4-Methylphenol	ND	670	
N-Nitroso-Di-N-propylamine	ND	670	
Hexachloroethane	ND	670	
Nitrobenzene	ND	670	
Isophorone	ND	670	
2-Nitrophenol	ND	670	
2,4-Dimethylphenol	ND	670	
Benzoic Acid	ND	3,300	
bis(2-Chloroethoxy)methane	ND	670	
2,4-Dichlorophenol	ND	670	
1,2,4-Trichlorobenzene	ND	670	
Naphthalene	ND	670	
4-Chloroaniline	ND	1,300	
Hexachlorobutadiene	ND	670	
4-Chloro-3-methylphenol	ND	1,300	
2-Methylnaphthalene	ND	670	
Hexachlorocyclopentadiene	ND	670	
2,4,6-Trichlorophenol	ND	670	
2,4,5-Trichlorophenol	ND	670	
2-Chloronaphthalene	ND	670	
2-Nitroaniline	ND	3,300	
Dimethyl phthalate	ND	670	
Acenaphthylene	ND	670	

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SOUND ANALYTICAL SERVICES, INC.

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Page 2 of 3

Client: Burlington Environmental - Engineering
 Lab No: 27711qc3
 Units: ug/kg
 Date: December 9, 1992
 Blank No: S6641
 Date Analyzed: 11-5-92

METHOD BLANK

Compound	Blank Value	PQL	Flags
3-Nitroaniline	ND	3,300	
Acenaphthene	ND	670	
2,4-Dinitrophenol	ND	3,300	
4-Nitrophenol	ND	3,300	
Dibenzofuran	ND	670	
2,4-Dinitrotoluene	ND	670	
2,6-Dinitrotoluene	ND	670	
Diethylphthalate	ND	670	
4-Chlorophenyl phenyl ether	ND	670	
Fluorene	ND	670	
4-Nitroaniline	ND	3,300	
4,6-Dinitro-2-methylphenol	ND	3,300	
N-Nitrosodiphenylamine	ND	670	
4-Bromophenyl phenyl ether	ND	670	
Hexachlorobenzene	ND	670	
Pentachlorophenol	ND	3,300	
Phenanthrene	ND	670	
Anthracene	ND	670	
Di-n-butylphthalate	1,800	670	
Fluoranthene	ND	670	
Pyrene	ND	670	
Butyl benzyl phthalate	1,100	670	
3,3'-Dichlorobenzidine	ND	1,300	
Benzo(a)anthracene	ND	670	
bis(2-ethylhexyl)phthalate	120	670	J
Chrysene	ND	670	
Di-n-octyl phthalate	ND	670	
Benzo(b)fluoranthene	ND	670	
Benzo(k)fluoranthene	ND	670	
Benzo(a)pyrene	ND	670	
Indeno(1,2,3-cd)pyrene	ND	670	
Dibenz(a,h)anthracene	ND	670	
Benzo(g,h,i)perylene	ND	670	

Continued. . . .

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Page 3 of 3

Client: Burlington Environmental - Engineering
Lab No: 27711qc3
Units: ug/kg
Date: December 9, 1992
Blank No: S6641
Date Analyzed: 11-5-92

ND = Not Detected.

PQL = Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.

SEMIVOLATILE SURROGATES

Surrogate	Percent Recovery	Control Limits	
		Water	Soil
Nitrobenzene - d5	92	35 - 114	23 - 120
2-Fluorobiphenyl	89	43 - 116	30 - 115
p-Terphenyl-d14	100	33 - 141	18 - 137
Phenol-d6	77	10 - 94	24 - 113
2-Fluorophenol	93	21 - 100	25 - 121
2,4,6-TBP	83	10 - 123	19 - 122

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QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Page 1 of 3

Client: Burlington Environmental
Lab No: 27711qd
Matrix: Soil
Units: ug/kg
Date: November 5, 1992
Dup No: 27711-6

DUPLICATE

Compound	Sample (S)	Duplicate (D)	RPD	FLAGS
Phenol	ND	ND	0.0	
bis(2-Chloroethyl) ether	ND	ND	0.0	
2-Chlorophenol	ND	ND	0.0	
1,3-Dichlorobenzene	ND	ND	0.0	
1,4-Dichlorobenzene	ND	ND	0.0	
Benzyl Alcohol	ND	ND	0.0	
1,2-Dichlorobenzene	ND	ND	0.0	
2-Methylphenol	ND	ND	0.0	
bis(2-Chloroisopropyl) ether	ND	ND	0.0	
4-Methylphenol	ND	ND	0.0	
N-Nitroso-Di-N-propylamine	ND	ND	0.0	
Hexachloroethane	ND	ND	0.0	
Nitrobenzene	ND	ND	0.0	
Isophorone	ND	ND	0.0	
2-Nitrophenol	ND	ND	0.0	
2,4-Dimethylphenol	ND	ND	0.0	
Benzoic Acid	ND	ND	0.0	
bis(2-Chloroethoxy) methane	ND	ND	0.0	
2,4-Dichlorophenol	ND	ND	0.0	
1,2,4-Trichlorobenzene	ND	ND	0.0	
Naphthalene	ND	ND	0.0	
4-Chloroaniline	ND	ND	0.0	
Hexachlorobutadiene	ND	ND	0.0	
4-Chloro-3-methylphenol	ND	ND	0.0	
2-Methylnaphthalene	ND	ND	0.0	
Hexachlorocyclopentadiene	ND	ND	0.0	
2,4,6-Trichlorophenol	ND	ND	0.0	
2,4,5-Trichlorophenol	ND	ND	0.0	
2-Chloronaphthalene	ND	ND	0.0	
2-Nitroaniline	ND	ND	0.0	
Dimethyl phthalate	ND	ND	0.0	

Continued

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Page 2 of 3

Client: Burlington Environmental
 Lab No: 27711qd
 Matrix: Soil
 Units: ug/kg
 Date: November 5, 1992
 Dup No: 27711-6

DUPLICATE

Compound	Sample (S)	Duplicate (D)	RPD	FLAGS
Acenaphthylene	ND	ND	0.0	
3-Nitroaniline	ND	ND	0.0	
Acenaphthene	ND	ND	0.0	
2,4-Dinitrophenol	ND	ND	0.0	
4-Nitrophenol	ND	ND	0.0	
Dibenzofuran	ND	ND	0.0	
2,4-Dinitrotoluene	ND	ND	0.0	
2,6-Dinitrotoluene	ND	ND	0.0	
Diethylphthalate	ND	ND	0.0	
4-Chlorophenyl phenyl ether	ND	ND	0.0	
Fluorene	ND	ND	0.0	
4-Nitroaniline	ND	ND	0.0	
4,6-Dinitro-2-methylphenol	ND	ND	0.0	
N-Nitrosodiphenylamine	ND	ND	0.0	
4-Bromophenyl phenyl ether	ND	ND	0.0	
Hexachlorobenzene	ND	ND	0.0	
Pentachlorophenol	ND	ND	0.0	
Phenanthrene	ND	ND	0.0	
Anthracene	ND	ND	0.0	
Di-n-butylphthalate	ND	ND	0.0	
Fluoranthene	ND	ND	0.0	
Pyrene	ND	ND	0.0	
Butyl benzyl phthalate	ND	ND	0.0	
3,3'-Dichlorobenzidine	ND	ND	0.0	
Benzo(a)anthracene	ND	ND	0.0	
bis(2-ethylhexyl)phthalate	ND	ND	0.0	
Chrysene	ND	ND	0.0	
Di-n-octyl phthalate	ND	ND	0.0	
Benzo(b)fluoranthene	ND	ND	0.0	
Benzo(k)fluoranthene	ND	ND	0.0	
Benzo(a)pyrene	ND	ND	0.0	
Indeno(1,2,3-cd)pyrene	ND	ND	0.0	
Dibenz(a,h)anthracene	ND	ND	0.0	
Benzo(g,h,i)perylene	ND	ND	0.0	

Continued

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270

Page 3 of 3

Client: Burlington Environmental
Lab No: 27711qd
Matrix: Soil
Units: ug/kg
Date: November 5, 1992
Dup No: 27711-6

DUPLICATE

ND = Not Detected

*Compound was detected but below PQL. Value shown is an estimated quantity.

RPD = Relative Percent Difference
= $[(S - D) / ((S + D) / 2)] \times 100$

SEMIVOLATILE SURROGATES

Surrogate	Sample	Duplicate	Control Limits	
			Water	Soil
Nitrobenzene - d5	67	82	35 - 114	23 - 120
2-Fluorobiphenyl	73	84	43 - 116	30 - 115
p-Terphenyl-d14	84	101	33 - 141	18 - 137
Phenol-d6	63	79	10 - 94	24 - 113
2-Fluorophenol	70	90	21 - 100	25 - 121
2,4,6-TBP	70	80	10 - 123	19 - 122

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SOIL MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

Client Name: Burlington Environmental - Engineering
Lab No: 27711qc5
Date: December 9, 1992

SEMI-VOLATILE ORGANICS

MS/MSD No. 27711-3

COMPOUND	SPIKE ug/kg	SAMPLE RESULT	CONC MS	% REC	CONC MSD	% REC	RPD	FLAG
1,2,4-Trichlorobenzene	3,500	ND	2,300	67	2,100	59	13.0	
Acenaphthene	3,500	1,500	3,800	66	3,500	57	15.0	
2,4 Dinitrotoluene	3,500	ND	2,000	58	1,800	50	15.0	
Pyrene	3,500	3,000	5,700	77	4,400	40	63.0	X7a
N-nitrosodi-n-Propylamine	3,500	ND	2,800	80	2,500	72	11.0	
1,4-Dichlorobenzene	3,500	ND	2,400	69	2,200	61	12.0	
Pentachlorophenol	3,500	ND	ND	0	ND	0	0.0	
Phenol	3,500	ND	2,200	64	1,800	51	22.0	
2-Chlorophenol	3,500	ND	2,400	68	1,900	54	23.0	
4-Chloro-3-Methylphenol	3,500	ND	1,900	54	ND	0	200.0	X7a
4-Nitrophenol	3,500	ND	ND	0	ND	0	0.0	

RPD = Relative Percent Difference

% REC = Percent Recovery

*QC Limits:

	RPD	% RECOVERY
1,2,4-Trichlorobenzene	23	38 - 107
Acenaphthene	19	31 - 137
2,4 Dinitrotoluene	47	28 - 89
Pyrene	36	35 - 142
N-nitrosodi-n-Propylamine	38	41 - 126
1,4-Dichlorobenzene	27	28 - 104
Pentachlorophenol	47	17 - 109
Phenol	35	26 - 90
2-Chlorophenol	50	25 - 102
4-Chloro-3-Methylphenol	33	26 - 103
4-Nitrophenol	50	11 - 114

* These are advisory limits only.

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SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

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DATA QUALIFIER FLAGS

- ND: Indicates that the analyte was analyzed for but was not detected. The associated numerical value is the practical quantitation limit, corrected for sample dilution.
- J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
- C: The identification of this analyte was confirmed by GC/MS.
- B: This analyte was also detected in the associated method blank. There is a possibility of blank contamination.
- E: The concentration of this analyte exceeded the instrument calibration range.
- D: The reported result for this analyte is calculated based on a secondary dilution factor.
- A: This TIC is a suspected aldol-condensation product.
- M: Quantitation Limits are elevated due to matrix interferences.
- S: The calibration quality control criteria for this compound were not met. The reported concentration should be considered an estimated quantity.
- X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.
- X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.
- X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.
- X4: RPD for duplicates outside QC limits. Sample was re-analyzed with similar results. Sample matrix is nonhomogeneous.
- X4a: RPD for duplicates outside QC limits due to analyte concentration near the method practical quantitation limit/detection limit.
- X5: Matrix spike was diluted out during analysis.
- X6: Recovery of matrix spike outside QC limits. Sample was re-analyzed with similar results.
- X7: Recovery of matrix spike outside QC limits. Matrix interference is indicated by blank spike recovery data.
- X7a: RPD value for MS/MSD outside QC limits due to high contaminant levels.
- X8: Surrogate was diluted out during analysis.
- X9: Surrogate recovery outside QC limits due to matrix composition.
- X10: Surrogate recovery outside QC limits due to high contaminant levels.

Data Set 744



CHAIN OF CUSTODY

